REMARKS

Reconsideration of the application in view of the above amendments and the following remarks is requested. Claims 1-15 are in this application. Claims 1, 7, and 13 have been amended. Claims 16-20 have been cancelled in accordance with restriction requirement mailed June 6, 2002.

The Examiner objected to the title of the specification, noting that the title of the invention was not descriptive. The title of the invention has been amended to reflect the title suggested by the Examiner.

The Examiner objected to claims 1 and 10 as not particularly defining the subject matter which applicant regards as the invention due to the terminology used in the claims. Applicant has reviewed claims 1 and 10 and, respectfully, can find no basis for the objection. Specifically, the Examiner suggested changing the phrase "a layer of isolation material," as used in lines 12, 16, and 26 of claim 1, to "a first layer of isolation material," and the phrase "a layer of isolation material," as used in lines 18, 19, and 21 of claim 1, to "a second layer of isolation material." Applicant notes, however, that the phrase on lines 18, 19, and 21 of claim 1 does not recite "a layer of isolation material," but instead recites "a layer of insulation material."

The Examiner also suggested changing the phrase "conductive via," as used on lines 22 and 23 of claim 1 and line 6 of claim 10 to "conductive contact." Claim 1 recites, in part,

> "a second metal trace formed on the layer of insulation material and the conductive via to make an electrical contact with the conductive via."

Claim 10 recites, in part,

> "the titanium protection layer is formed on the insulation layer and the conductive via under the second metal trace."

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As shown in applicant's FIG. 2, the second metal trace can be read to be, for example, metal-2 trace 232, while the layer of insulation material can be read to be, for example, insulation layer 224. In addition, the conductive via can be read to be, for example, via 226. Thus, without further direction from the Examiner, applicant respectfully can find no basis for the objection.

The Examiner rejected claims 1-6 and 10-12 under 35 U.S.C. §103 (a) as being unpatentable over Thomas et al. (5,117,276) in view of the Background of the Invention. For the reasons set forth below, applicant respectfully traverses this rejection. Claim 1 has been amended, and recites, in part,

> "a single titanium protection layer formed over the first layer of isolation material and the conductive contact, and below the layer of passivation material."

In rejecting the claims, the Examiner pointed to second adhesion layer 34 shown in FIG. 1K of Thomas as constituting the titanium protection layer required by claim 1. The Thomas reference, however, fails to teach or suggest a semiconductor structure that has a single titanium protection layer.

The Thomas reference discloses the use of titanium layers which are used to provide adhesion. As further disclosed by Thomas,

> "if a process with good tungsten adhesion is employed, it would then be possible to eliminate the tungsten adhesion layer 34." (See column 8, lines 16-19.)

Thus, if a process with poor tungsten adhesion is used, a titanium adhesion layer is used with each metal layer. On the other hand, if a process with good tungsten adhesion is used, no titanium adhesion layer is needed for any of the metal layers. As a result, there appears to be no instance in Thomas where one skilled in the art would be motivated to use a single titanium adhesion layer. The titanium

adhesion layer is either needed for all of the metal layers, or none of the metal layers.

Therefore, since the Thomas reference does not teach or suggest the use of a single titanium protection layer, claim 1 is patentable over Thomas et al. in view of the Background of the Invention. In addition, since claims 2-6 and 10-12 depend either directly or indirectly from claim 1, claims 2-6 and 10-12 are patentable over Thomas et al. (5,117,276) in view of the Background of the Invention for the same reasons as claim 1.

The Examiner objected to claims 7-9 and 13-15 as being dependent upon a rejected base claim, but indicated that the referenced claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claims 7 and 13 have been rewritten as independent claims and are believed to incorporate all of the required limitations. Claims 8-9 and 14-15 depend from claims 7 and 13, respectively. As a result, claims 8-9 and 14-15 have not been amended to be in independent form.

Thus, for the foregoing reasons, it is submitted that the specification and all of the claims are in a condition for allowance. Therefore, the Examiner's early re-examination and reconsideration are respectively requested.

Respectfully submitted,

Dated: 11-6-02 By: _____

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APPENDIX

In the Title

Please amend the title in all instances as follows:

APPARATUS [AND METHOD] FOR REDUCING SURFACE ZENER DRIFT USING TI-BASED METALLURGY

In the Claims

Please cancel claims 16-20.

Please amend the claims as follows:

1. (Amended) A semiconductor structure formed in a semiconductor material of a first conductivity type, the semiconductor material having a first dopant concentration, the semiconductor structure comprising:

a first region of the first conductivity type formed in the semiconductor material, the first region having a dopant concentration that is greater than the dopant concentration of the semiconductor material;

a second region of a second conductivity type formed in the semiconductor material to adjoin the first region;

a layer of isolation material formed on the semiconductor material;

a conductive contact formed through the layer of isolation material to make an electrical contact with the first region;

a first metal trace formed over the layer of isolation material and the conductive contact;

a layer of insulation material formed on the first metal trace;

a conductive via formed through the layer of insulation material to make an electrical contact with the first metal trace;

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a second metal trace formed on the layer of insulation material and the conductive via to make an electrical contact with the conductive via;

a layer of passivation material formed over the second metal trace, the layer of passivation material including nitride; and

a single titanium protection layer formed over the layer of isolation material and the conductive contact, and below the layer of passivation material.

7. (Amended) [The apparatus of claim 1 wherein] A semiconductor structure formed in a semiconductor material of a first conductivity type, the semiconductor material having a first dopant concentration, the semiconductor structure comprising:

a first region of the first conductivity type formed in the semiconductor material, the first region having a dopant concentration that is greater than the dopant concentration of the semiconductor material;

a second region of a second conductivity type formed in the semiconductor material to adjoin the first region;

a layer of isolation material formed on the semiconductor material;

a conductive contact formed through the layer of isolation material to make an electrical contact with the first region;

a first metal trace formed over the layer of isolation material and the conductive contact;

a layer of insulation material formed on the first metal trace;

a conductive via formed through the layer of insulation material to make an electrical contact with the first metal trace;

a second metal trace formed on the layer of insulation material and the conductive via to make an electrical contact with the conductive via;

a layer of passivation material formed over the second metal trace, the layer of passivation material including nitride; and

a titanium protection layer formed over the layer of isolation material and the conductive contact, and below the layer of passivation material, the titanium protection layer [is] being formed on and over the first metal trace.

13. (Amended) [The apparatus of claim 1 wherein] A semiconductor structure formed in a semiconductor material of a first conductivity type, the semiconductor material having a first dopant concentration, the semiconductor structure comprising:

a first region of the first conductivity type formed in the semiconductor material, the first region having a dopant concentration that is greater than the dopant concentration of the semiconductor material;

a second region of a second conductivity type formed in the semiconductor material to adjoin the first region;

a layer of isolation material formed on the semiconductor material;

a conductive contact formed through the layer of isolation material to make an electrical contact with the first region;

a first metal trace formed over the layer of isolation material and the conductive contact;

a layer of insulation material formed on the first metal trace;

a conductive via formed through the layer of insulation material to make an electrical contact with the first metal trace;

a second metal trace formed on the layer of insulation material and the conductive via to make an electrical contact with the conductive via;

a layer of passivation material formed over the second metal trace, the layer of passivation material including nitride; and

a titanium protection layer formed over the layer of isolation material and the conductive contact, and below the layer of passivation material, the titanium protection layer [is] being formed on and over the second metal trace.

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